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(54) **OFFSET ELECTRICAL TERMINAL BOX WITH ANGLED STUDS**

(71) Applicant: **Thomas Rogalski**, Clay, NY (US)

(72) Inventor: **Thomas Rogalski**, Clay, NY (US)

(73) Assignee: **BITZER Kuehlmaschinenbau GmbH**, Sindelfingen (DE)

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(51) **Int. Cl.**

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F01C 21/10	(2006.01)
F04C 18/02	(2006.01)
F04C 23/00	(2006.01)

(52) **U.S. Cl.**

CPC ***F01C 21/10*** (2013.01); ***F04C 18/0207*** (2013.01); ***F04C 23/008*** (2013.01); *F04C 2240/30* (2013.01); *F04C 2240/805* (2013.01); *F04C 18/0215* (2013.01); *F04C 2240/803* (2013.01); *F04C 2240/808* (2013.01)

(58) **Field of Classification Search**

CPC F04C 23/008; F04C 2240/30; F04C 2240/803; F04C 2240/805

USPC 417/410.1, 410.5, 422, 902; 361/22, 23, 361/117, 119, 600

See application file for complete search history.

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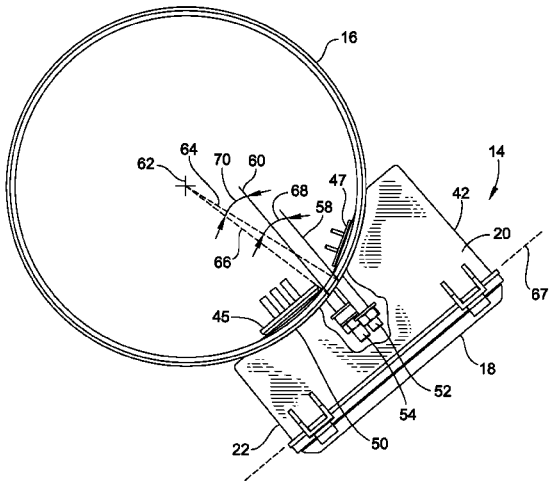
Primary Examiner — Peter J Bertheaud

(74) *Attorney, Agent, or Firm* — Reinhart Boerner Van Deuren P.C.

(57) **ABSTRACT**

A compressor assembly includes a housing that is annular and surrounds a longitudinal central axis. The compressor also has a compressor housed in the housing, a terminal box, and a first stud coupling the terminal box with the housing. The first stud defines a first central axis. A second stud also couples the terminal box with the housing. The second stud defines a second central axis. Both the first and second central axes extend through the housing on the same side of the longitudinal central axis of the housing.

15 Claims, 6 Drawing Sheets



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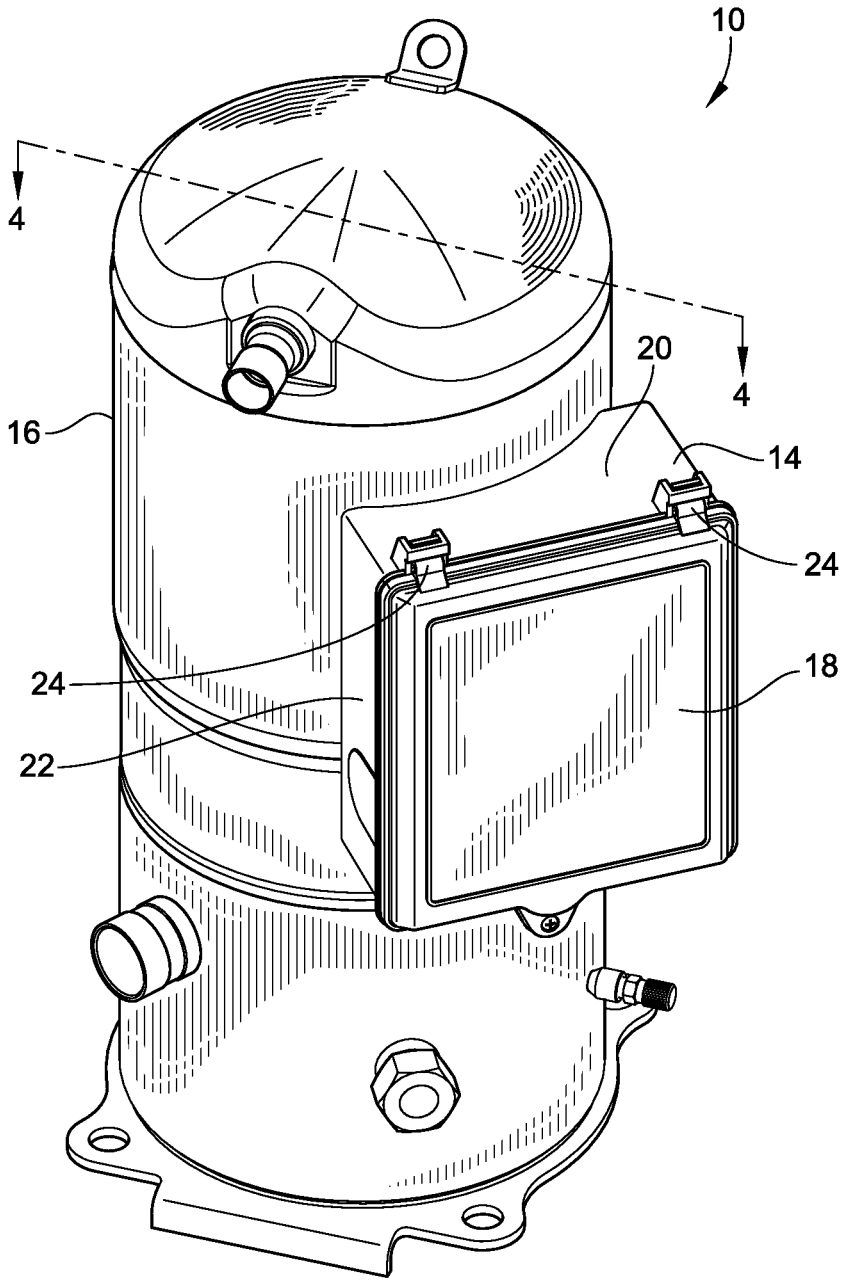

FIG. 1

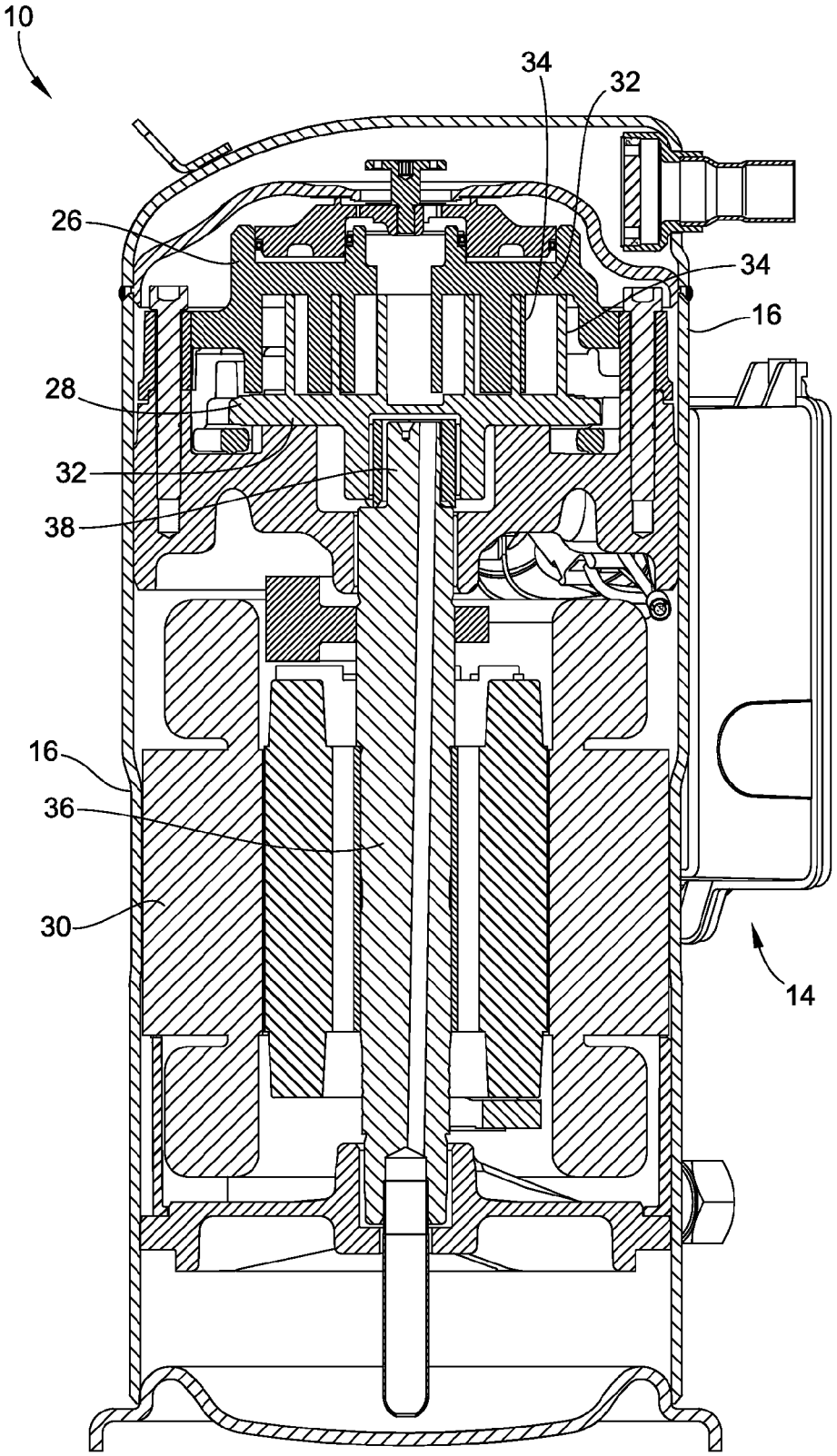

FIG. 2

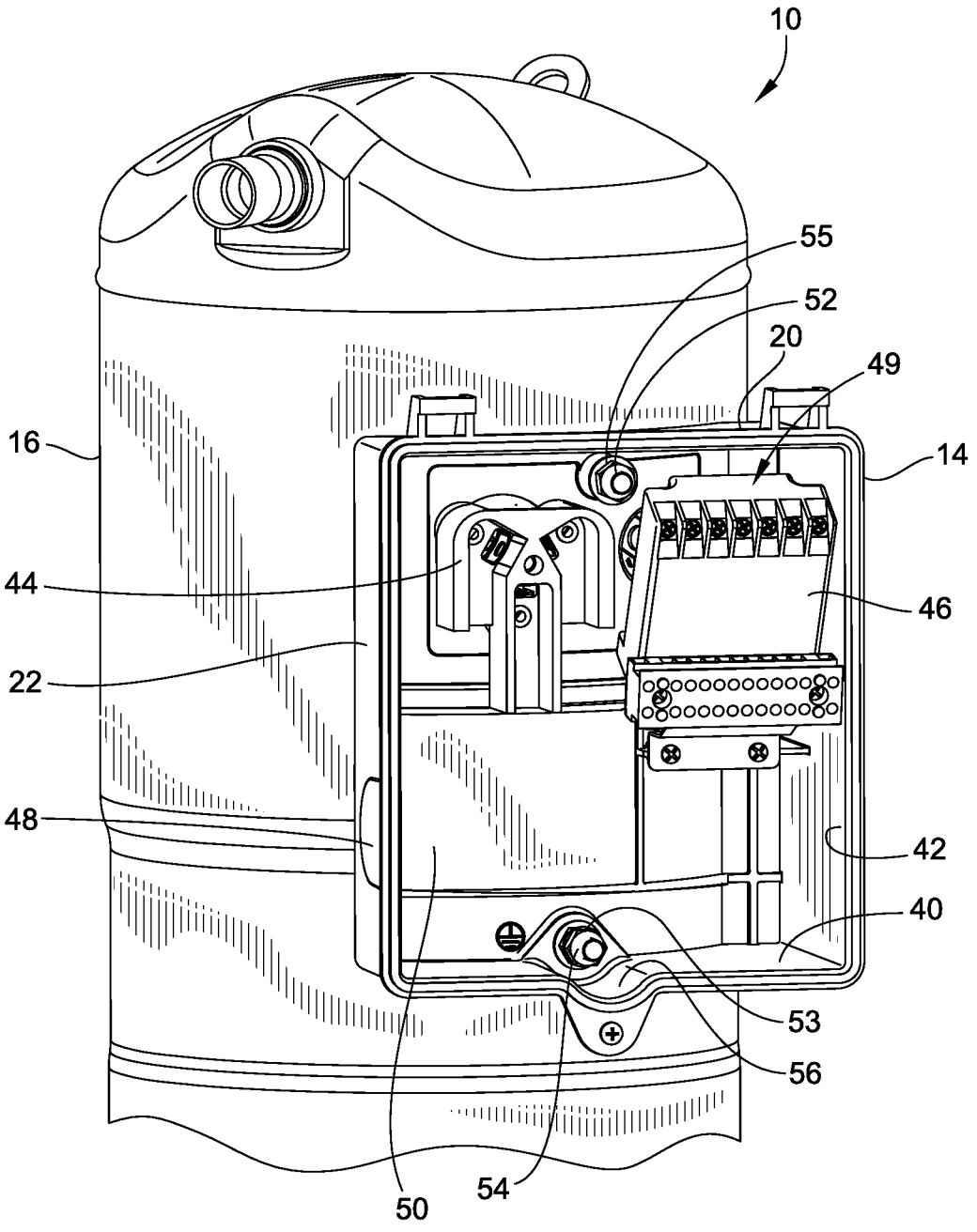

FIG. 3

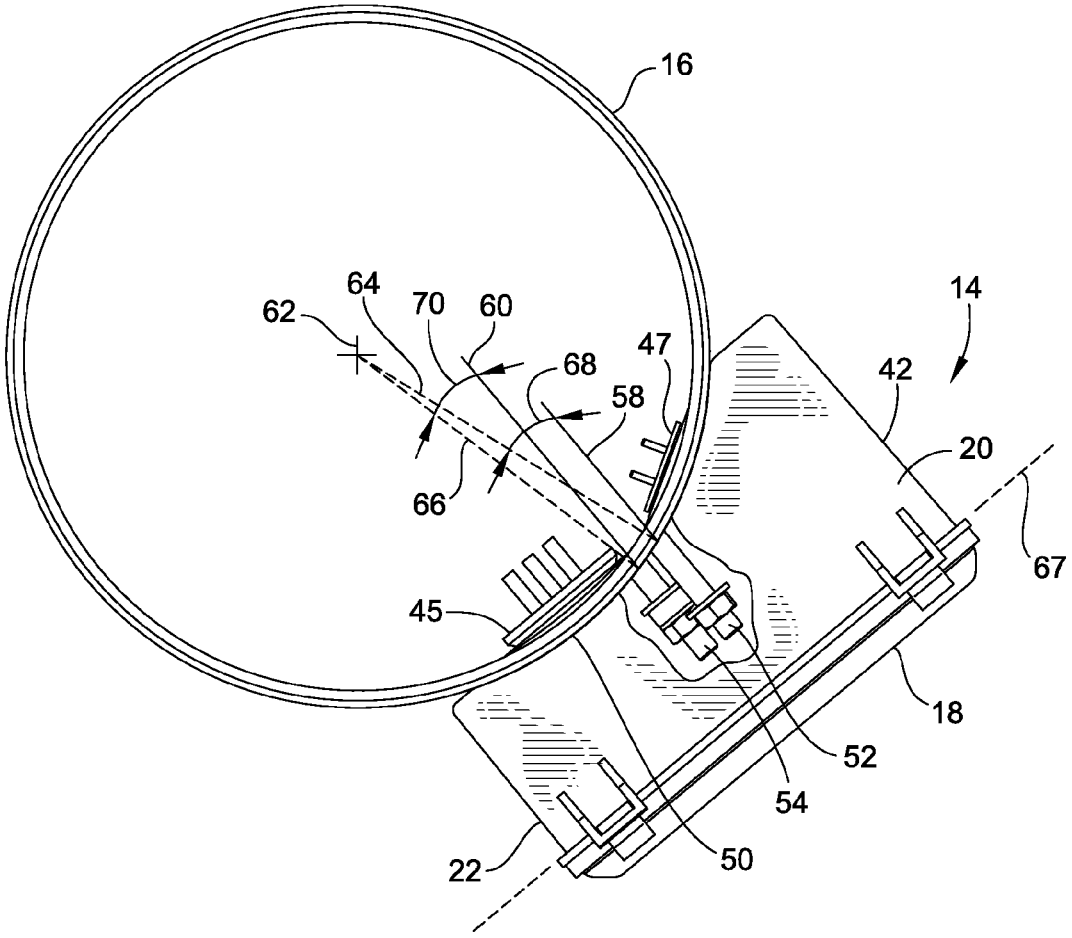

FIG. 4

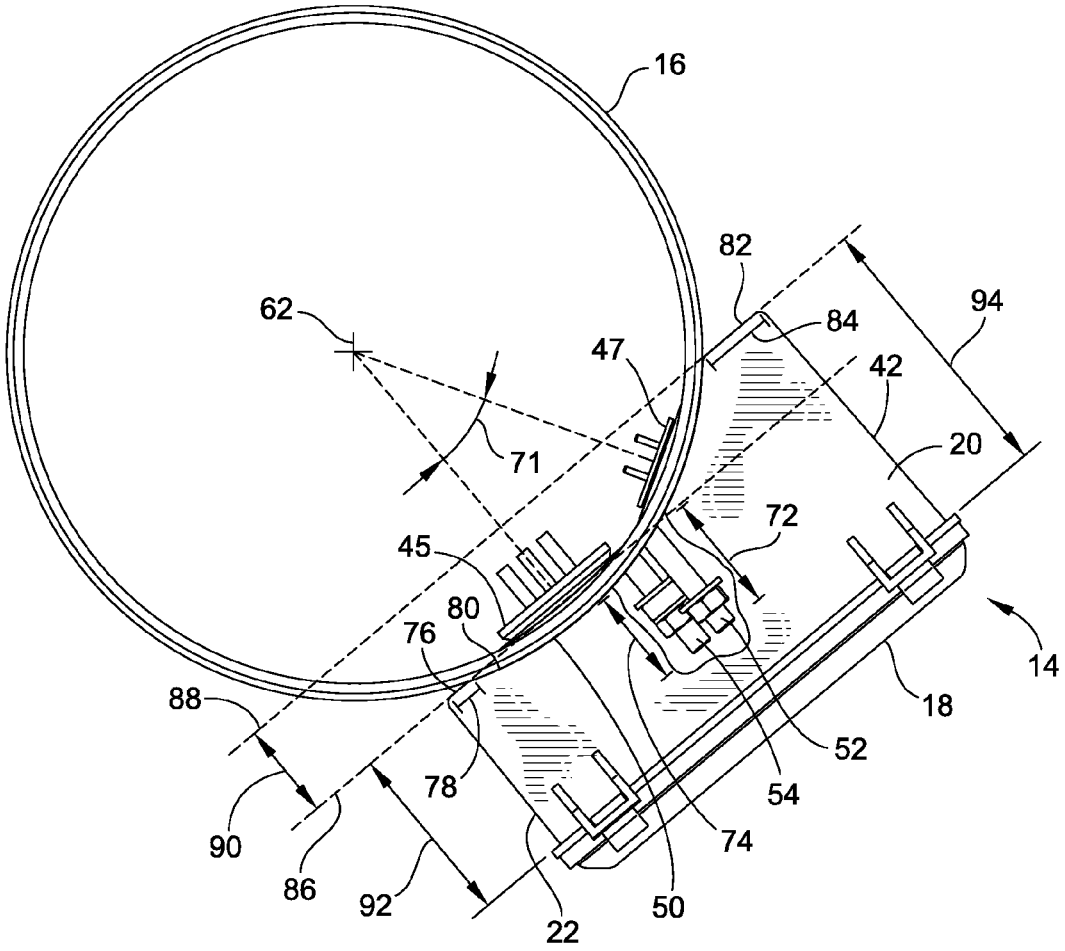
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FIG. 5

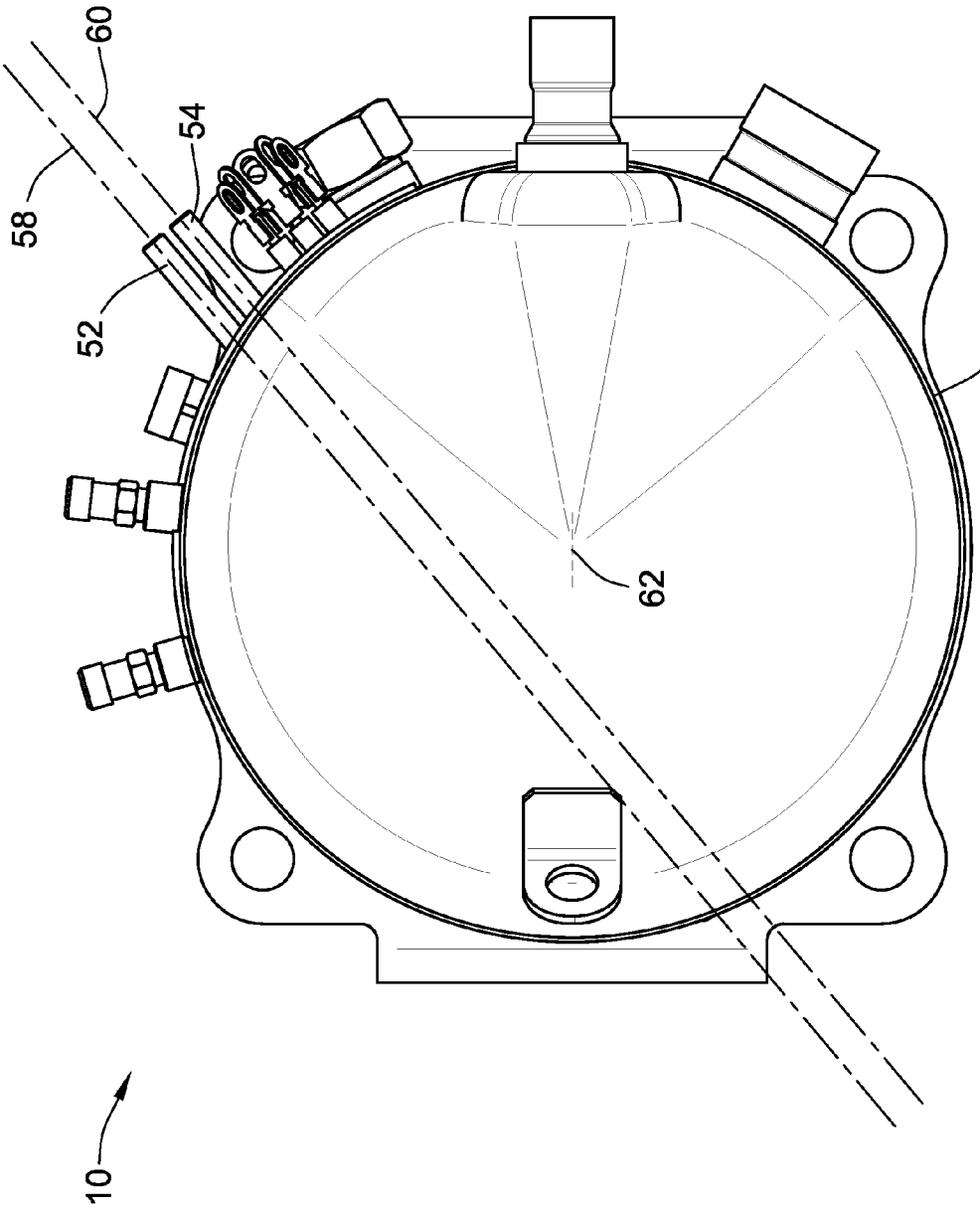

FIG. 6

OFFSET ELECTRICAL TERMINAL BOX WITH ANGLED STUDS

CROSS-REFERENCE TO RELATED PATENT APPLICATIONS

This patent application is a continuation-in-part of co-pending U.S. patent application Ser. No. 13/427,991, filed Mar. 23, 2012, the entire teachings and disclosure of which are incorporated herein by reference thereto.

FIELD OF THE INVENTION

The present invention generally relates to compressors for compressing refrigerant and more particularly relates to electrical terminal boxes and couplings for scroll compressors and/or other such suitable compressors.

BACKGROUND OF THE INVENTION

A scroll compressor is a certain type of compressor that is used to compress refrigerant for such applications as refrigeration, air conditioning, industrial cooling and freezer applications, and/or other applications where compressed fluid may be used. Such prior scroll compressors are known, for example, as exemplified in U.S. Pat. No. 6,398,530 to Hasemann; U.S. Pat. No. 6,814,551, to Kammhoff et al.; U.S. Pat. No. 6,960,070 to Kammhoff et al.; U.S. Pat. No. 7,112,046 to Kammhoff et al.; and U.S. Pat. No. 7,997,877, to Beagle et al., all of which are assigned to a Bitzer entity closely related to the present assignee. As the present disclosure pertains to improvements that can be implemented in these or other scroll compressor designs, the entire disclosures of U.S. Pat. Nos. 6,398,530; 7,112,046; 6,814,551; and 6,960,070 are hereby incorporated by reference in their entirety.

As is exemplified by these patents, scroll compressors conventionally include an outer housing having a scroll compressor contained therein. A scroll compressor includes first and second scroll compressor members. A first compressor member is typically arranged stationary and fixed in the outer housing. A second scroll compressor member is moveable relative to the first scroll compressor member in order to compress refrigerant between respective scroll ribs which rise above the respective bases and engage in one another. Conventionally the moveable scroll compressor member is driven about an orbital path about a ventral axis for the purpose of compressing refrigerant. An appropriate drive unit, typically an electric motor, is usually provided within the same housing to drive the movable scroll member.

Scroll compressors may include a protection module, a block, such as an external terminal block, and a power connector which may be contained with the electrical terminal box mounted to the outside of the scroll compressor housing.

BRIEF SUMMARY OF THE INVENTION

In one aspect an embodiment of the invention provides a compressor assembly. The compressor assembly includes a housing. The housing is annular and surrounds a longitudinal central axis. The compressor assembly also includes a compressor housed in the housing. The compressor assembly also includes a terminal box. The compressor assembly also includes a first stud and a second stud. The first and second studs couple the terminal box with the housing. The first stud defines a first central axis, and the second stud defining a second central axis. Both the first and second central axes extend through the housing on the same side of the longitudinal central axis of the housing.

In a particular embodiment of the invention, the first central axis does not intersect the longitudinal central axis of the housing, and the second central axis does not intersect the longitudinal central axis of the housing. In certain embodiments, the first and second studs are vertically aligned. In alternate embodiments, the first stud and the second stud are offset horizontally and vertically relative to one another. In some embodiments, the first central axis is substantially parallel to the second central axis.

The compressor assembly may include an external block and a protection module positioned within the terminal box, and the first stud may be arranged in a first plane that extends between the external block and the protection module, while the second stud is located in a second plane parallel and non-coextensive with the first plane. The first and second planes may be vertical and include the first central axis and the second central axis respectively.

In a particular embodiment, the terminal box includes first and second sidewalls, where the first stud is a distance D from the second sidewall, and the first stud is a distance D' from the first sidewall such that D' is greater than D. In a further embodiment, the second stud is the distance D from the first sidewall, the second stud is the distance D' from the second sidewall, and the first stud and the second stud are offset by the distance D'−D.

In certain embodiments, the volume defined by the portion of the terminal box between a plane in which the first stud is positioned and the second sidewall is greater than the volume defined by the portion of the terminal box between the second stud and the first sidewall. The compressor assembly may also include a block and a protection module disposed in the terminal box, where first and second sidewalls, a top wall, a bottom wall, and a back wall define the terminal box. The second stud may be located closer to the first sidewall than the first stud.

In a particular embodiment, a radius from the longitudinal central axis of the housing and the first central axis of the first stud define a non-zero angle. Further, a radius from the longitudinal central axis of the housing the second central axis of the second stud may also define a non-zero angle.

In another aspect, an embodiment of the invention provides a compressor assembly. The compressor assembly includes a housing. The compressor assembly also includes a compressor housed in the housing. The compressor assembly also includes first and second sidewalls, a top wall, a bottom wall, and a back wall defining a terminal box. The compressor assembly also includes a block and a protection module disposed in the terminal box. The compressor also includes a first stud and a second stud. The studs couple the terminal box to the housing. The second stud is located closer to the first sidewall than the first stud.

In yet another aspect, an embodiment of the invention provides a compressor assembly. The compressor assembly includes a housing. The housing is generally cylindrical about a vertical axis. The compressor assembly also includes a compressor. The compressor is housed in the housing. The compressor assembly also includes a terminal box. The terminal box has first and second sidewalls, a top wall, and a bottom wall. A back wall of the terminal box may have an arcuate shape to conform to an outer surface of the housing. The first and second sidewalls extend transversely between the top and bottom walls in spaced relation. The top and bottom walls extend transversely between the first and second sidewalls in spaced relation. The first and second sidewalls, the top wall, the bottom wall, and the back define a box

interior. The sidewalls extend from an open front side to the back. The compressor assembly also includes a protection module disposed in the terminal box. The terminal box is non-symmetrically arranged on the housing. The first sidewall is shorter than the second sidewall so that the terminal box is deeper from front to back proximate the second sidewall as compared to the first sidewall.

Other aspects, objectives and advantages of the invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings incorporated in and forming a part of the specification illustrate several aspects of the present invention and, together with the description, serve to explain the principles of the invention. In the drawings:

FIG. **1** is a perspective view of a scroll compressor assembly including a electrical terminal box in accordance with an embodiment of the present invention;

FIG. **2** is a cross sectional view of the scroll compressor assembly including an electrical terminal box of FIG. **1**;

FIG. **3** is a perspective view of the scroll compressor assembly including an electrical terminal box of FIG. **1** with the cover of the electrical terminal box removed;

FIG. **4** is a partial cross sectional view of the scroll compressor assembly including an electrical terminal box taken along the line **4-4** in FIG. **1**;

FIG. **5** is the partial cross sectional view of FIG. **4** illustrating relative dimensions of various portions of the scroll compressor assembly including an electrical terminal box; and

FIG. **6** is a top view of the compressor showing an orientation of the first and second angled studs, according to an embodiment of the invention.

While the invention will be described in connection with certain preferred embodiments, there is no intent to limit it to those embodiments. On the contrary, the intent is to cover all alternatives, modifications and equivalents as included within the spirit and scope of the invention as defined by the appended claims.

DETAILED DESCRIPTION OF THE INVENTION

With reference to FIG. **1**, an embodiment of a scroll compressor assembly **10** including an electrical terminal box **14** in accordance with the teachings of the present invention is illustrated. Before turning to the details of the electrical terminal box **14**, some background about the illustrated scroll compressor assembly **10** will be provided for reference, although it is understood that this invention is applicable to other compressor configurations.

With reference to FIG. **1**, the illustrated scroll compressor assembly **10** generally includes an outer housing **16** (which may be formed from one or a plurality of sheet metal shell sections or any other suitable arrangement). Coupled with the outer housing **16** is the electrical terminal box **14**, as will be described further below. The electrical terminal box **14** includes a cover **18** and walls (top wall **20** and sidewall **22** illustrated in FIG. **1**). The cover **18** is displaceable relative to the walls to selectively allow or prevent access to the interior of the electrical terminal box **14**. The cover **18** is pivotally displaceable relative to the top wall **20** and coupled with the top wall **20** by a pair of hinges **24**, and covers a flat open end of the terminal box **14**.

The terminal box **14** may be formed from any suitable material known in the art, but is preferably molded of plastic material, and may be formed from any suitable number of pieces, but may include one unitary box component as shown, with the cover **18** being a separate part. While the cover **18** is illustrated hingedly coupled with the top wall **20**, other suitable arrangements are also envisioned, including, for example, the cover **18** interfitting with the walls in an interference fit configuration without hinges. Other suitable configurations are also envisioned.

With reference to FIG. **2**, the housing **16** contains scroll compressor bodies, including a fixed scroll compressor body **26** and a moveable scroll compressor body **28**. A drive unit **30**, such as, for example, an electric motor, is provided to drive the movable scroll compressor body **28** to facilitate compression of fluid. To this end, the scroll compressor bodies have respective bases **32** and scroll ribs **34** that project from their respective bases and which mutually engage about an axis for creating chambers for compressing fluid. The drive unit **30** is operative to provide rotational output on a drive shaft **36**, which includes an offset eccentric drive **38** that provides eccentric orbiting movement to the moveable scroll compressor body **28** relative to the fixed scroll compressor body **26**. The scroll compressor bodies provide for a compressor section of the compressor, while the drive unit **30** provides for a drive section of the scroll compressor.

With reference to FIG. **3**, the electrical terminal box **14** includes a top wall **20**, a first sidewall **22**, a bottom wall **40**, and a second sidewall **42**. The first and second sidewalls **22** and **42** extend transversely between the top and bottom walls **20** and **40** in spaced relation. The top and bottom walls **20** and **40** extend transversely between the first and second sidewalls **22** and **42** in spaced relation. The transverse and preferably perpendicular walls together define a box interior with an open front side. These walls **20**, **22**, **40**, **42** extend horizontally away from the compressor housing **16**, and together form the generally rectangular side boundary of the electrical terminal box **14**. Provided in the electrical terminal box **14** is an external terminal block, such as external block **44**. The external block **44** may include, for example, an insulating body with conductive inserts, such as, for example, metal inserts.

With reference to FIGS. **4** and **5**, a terminal block **45** is provided. The terminal block **45** includes a feedthrough set of sealed terminals assembled in a housing. The terminal block **45** is attached to and insulated from the housing **16**. The terminal block **45** provides a conduit to conduct power from outside the housing **16** to the motor within the housing **16**.

The external block **44** is configured to electrically couple and interface with the terminal block **45**. Thus, power cables may be connected with the conductive inserts of the external block **44** to provide power to the motor within the housing **16** by way of the terminal block **45**.

Also provided in the electrical terminal box **14** is a protection module **46** that can receive control leads (e.g., leads that carry on and off signals or variable control signals). The protection module **46** includes an electronic device enclosed in an insulating case with electrical terminals **49** to receive the control leads. The protection module **46** is coupled with the electrical terminal box **14**.

With reference to FIGS. **4** and **5**, a feedthrough **47** is provided. The feedthrough **47** is coupled with and electrically insulated from the housing **16**. The feedthrough **47** allows signals for sensing and control to pass to components within the housing **16** from outside the housing **16** and from components within the housing **16** to the outside of the housing **16**. In one embodiment, the feedthrough **47** may be smaller than the terminal block **45**, as the feedthrough **47** carries

electrical signals for sensing and control, while the terminal block **45** conducts larger amounts of current and power.

The protection module **46** is electrically coupled, e.g., with wires or other suitable mechanisms, with the feedthrough **47**. Thus, signals to and from the interior of the housing **16** may pass from the feedthrough **47** to the protection module **46**.

In one embodiment, the protection module **46** also may have the ability to protect the drive unit **30** and the scroll compressor from shorts, power surges, overheating, or provide other suitable electrical conditioning as may be appropriate.

The external block **44** may be electrically coupled by electrical leads (not shown in FIG. **3**) with the protection module **46**, as well as with a power source or power connector, which power source or power connector may be external or internal to the terminal box **14**.

The external block **44** and the protection module **46** may be secured within the electrical terminal box **14** by any suitable means known to those of skill in the art. It is envisioned that various different types and arrangements of components within terminal boxes may be used with embodiments of electrical terminal boxes coupled with compressor housings to form embodiments of compressor assemblies in accordance with the teachings of the present invention. For example, it is envisioned that arrangements of components such as the type described in U.S. Pat. No. 7,997,877, to Beagle et al., which is incorporated herein by reference in its entirety, may be housed within embodiments of terminal boxes in accordance with the teachings of the present invention. Additionally, use of other components and arrangements of components within terminal boxes coupled with compressor housings to form embodiments of compressor assemblies is also envisioned.

An aperture **48** is defined in the first sidewall **22** through which control leads may extend from outside of the electrical terminal box **14** to the protection module **46**. Additionally, power source leads may extend through the aperture **48** from an external power source to the external block **44**. In another embodiment, power source leads extend through an additional aperture in one of the walls **20**, **22**, **40**, and **42** of the electrical terminal box **14** from an external power source to the external block **44**. It is also envisioned that the aperture **48** may be defined in any of the walls **20**, **22**, **40**, and **42**.

As is illustrated in FIG. **4**, the sidewall of the compressor housing **16** is generally cylindrical in shape and surrounds a central axis which is also vertical. With reference to FIGS. **3** and **4**, the terminal box **14** also includes a back wall **50**. The back wall **50** and the housing **16** provide matching apertures. The terminal block **45** is disposed in a first aperture in the sidewall of the compressor housing **16**. A matching aperture is provided in the back wall **50** of the electrical terminal box **14** which allows electrical connections from the external block **44** to electrically couple with the terminal block **45**. A second aperture in the sidewall of the housing **16** is also provided. The feedthrough **47** is disposed within this second aperture. A matching aperture is provided in the back wall **50** of the terminal box **14** which allows electrical connections from the protection module **46** to electrically couple with the feedthrough **47**.

Thus, the external block **44** and the protection module **46**, and more particularly any components coupled with the external block **44** and the protection module **46**, may communicate with and/or provide power to components within the housing **16**, such as, for example, the drive unit **30**. The terminal block **45** and the feedthrough **47** may each provide a seal to provide sealing of the aperture in the sidewall of the housing **16** in which each is disposed preventing refrigerant within the housing **16** from leaking out as well as to prevent outside air or other contaminants from leaking into the housing **16**.

With further reference to FIGS. **3** and **4**, a top angled stud **52** and a bottom angled stud **54** are provided to couple the electrical terminal box **14** to the housing **16**. The top angled stud **52** is received by the electrical terminal box **14** proximate the top wall **20** between the external block **44** and the protection module **46**. The bottom angled stud **54** is received by the electrical terminal box **14** proximate the bottom wall **40**. The bottom wall **40** defines a recessed portion **56** proximate the bottom angled stud **54**. The recessed portion **56** may be configured to allow for access to the bottom angled stud **54** and a retaining nut **53**, allowing for installation of the retaining nut **53**.

The back wall **50** includes an upper and a lower aperture through which the angled studs **52** and **54** respectively pass to couple the electrical terminal box **14** to the housing **16**. The angled studs **52** and **54** may be any type of fasteners or fastening studs suitable to fasten the electrical terminal box **14** to the housing **16** and may include nuts, washers, threading, etc., or any other suitable features to allow for supporting the electrical terminal box **14** and coupling the electrical terminal box **14** to the housing **16**. The angled studs **52** and **54** may be bored into the housing **16**, the housing **16** may have suitable apertures, such as, for example, threaded apertures for receiving the angled studs **52** and **54**, the angled studs **52** and **54** may be welded to the housing **16**, etc. The angled studs **52** and **54** may be coupled with housing **16** by any suitable mechanism.

As illustrated in FIGS. **3** and **4**, in one embodiment the angled studs **52** and **54** are offset relative to one another, i.e., the bottom angled stud **54** is located relatively closer to the first sidewall **22** than the top angled stud **52**. This configuration may allow for easy access to the angled studs **52** and **54**, as well as access to install other components, e.g. retaining nut **53**, retaining nut **55**, etc., with, for example, a wrench, or any other suitable tool known to those of skill in the art. In other embodiments, the angled studs **52** and **54** may be configured in other arrangements, such as, for example, in one embodiment the top angled stud **52** may be located closer to the first sidewall **22** than the bottom angled stud **54**. Additionally, in another embodiment, the top angled stud **52** and the bottom angled stud **54** are aligned generally in the same vertical plane, with each located the same distance from the first sidewall **22** as the other. Other suitable arrangements are also envisioned.

As is illustrated in FIG. **4**, the angled studs **52** and **54** each define a central axis **58** and **60**. In the illustrated embodiment, the central axes **58** and **60** are each substantially parallel with one another and with the first sidewall **22** and the second sidewall **42** of the electrical terminal box **14**. The housing **16** is generally cylindrical about a longitudinal central axis **62**. The angled studs **52** and **54** are arranged such that the central axes **58** and **60** of the angled studs **52** and **54** do not intersect the longitudinal central axis **62** of the housing **16**. An upper radius **64**, from the longitudinal central axis **62** to the top angled stud **52**, and the central axis **58** of the top angled stud **52** form a non-zero angle **68**. A lower radius **66**, from the longitudinal central axis **62** to the bottom angled stud **54**, and the central axis **60** of the bottom angled stud **54** form a non-zero angle **70**.

In one embodiment, the top angled stud **52** is located in a vertical plane that extends between the external block **44** and the protection module **46**. The vertical plane includes the central axis **58** of the top angled stud **52**. The bottom angled stud **54** is located in a vertical plane that includes the central

axis **60** of the bottom angled stud **54**. In one embodiment, these vertical planes extend parallel to one another and are non-coextensive. In another embodiment, these vertical planes are coextensive and do not intersect the longitudinal central axis **62**.

The ends of the walls **20**, **22**, **40**, and **42** define the front opening of the electrical terminal box **14** and lie in a plane **67**. The plane **67** is non-parallel to a plane which is tangential to the housing **16** at the points at which the angled studs **52** and **54** meet the housing **16**.

As is illustrated in FIG. **5**, the terminal block **45** and the feedthrough **47** are spaced apart a circumferential distance and are radially angularly related by an angle **71**. Electrical coupling mechanisms electrically couple the external block **44** with the terminal block **45**. Additionally, electrical coupling mechanisms electrically couple the protection module **46** with the feedthrough **47**.

With further reference to FIG. **5**, various features of an embodiment of the electrical terminal box **14** are further described. The top angled stud **52** projects a distance **72** from the housing **16**. The bottom angled stud **54** projects a distance **74** from the housing **16**.

With further reference to FIG. **5**, the back wall **50** is further described. The back wall **50** includes a first portion **76** extending a distance **78** generally transversely from the first side wall **22**. In one embodiment the distance **78** is zero. The back wall **50** also includes a second portion **80** which extends from the first portion **76**. The second portion **80** is generally arcuate and shaped to generally match the curvature of the housing **16** and arranged to closely abut the housing **16**, with the second portion **80** extending from the first portion **76** to a third portion **82** of the back wall **50**. The third portion **82** extends from the second portion **80** to the second sidewall **42**. The third portion **82** extends for a distance **84** generally transversely to the second sidewall **42**, from the second portion **80** to the second sidewall **42**. In one embodiment the distance **84** is zero.

In one embodiment, the electrical terminal box **14** is shaped such that the distance **84** that the third portion **82** extends is greater than the distance **78** that the first portion **76** extends. Other suitable arrangements and configurations are also envisioned. In one embodiment, the first portion **76** is located in a first plane **86**, while the third portion **82** is located in a second plane **88**. The first and second planes **86** and **88** are generally parallel with one another, however, the second plane **88** is located closer to the longitudinal central axis **62** of the housing **16** than the first plane **86**. The first plane **86** and the second plane **88** are spaced apart by a distance **90**.

In another embodiment, the second portion **80** of the back wall **50** is omitted, i.e., there is an aperture extending between the first portion **76** and the third portion **82**, with the housing **16** itself acting as the central portion of the back wall of the electrical terminal box **14**.

The first sidewall **22** extends a distance **92** generally transversely away from the first portion **76** of the back wall **50**. The second sidewall **42** is generally parallel with the first sidewall **22**. The second sidewall **42** extends a distance **94** generally transversely away from the third portion **82** of the back wall **50**. In the illustrated embodiment, the distance **94** is greater than the distance **92** by an amount equal to the distance **90**. Thus, the electrical terminal box **14** is arranged non-symmetrically on the housing. Additionally, the portion of the electrical terminal box **14** between the angled studs **52** and **54** and the second sidewall **42** is deeper front to back and defines a greater volume than the portion of the electrical terminal box **14** between the angled studs **52** and **54** and the first sidewall **22**. The portion of the electrical terminal box **14** between the angled studs **52** and **54** and the first sidewall **22** is shallower front to back and defines a lesser volume than the portion of the electrical terminal box **14** between the angled studs **52** and **54** and the second sidewall **42**.

Based on this arrangement, embodiments of terminal boxes may be space-saving, providing a deeper portion to allow components requiring more space proximate the second sidewall **42** and a shallower portion accommodating components requiring less space proximate the first sidewall **22**.

The arrangement of the illustrated embodiment provides the room and spacing which allows for easy access, manipulation, and replacement of components in the electrical terminal box. While the embodiment is described with respect to an electrical terminal box including certain components, it is also envisioned that the subject matter of the present invention may be used in conjunction with other suitable components to be included in an electrical terminal box.

FIG. **6** is a top view of the compressor **10** showing an orientation of the first and second angled studs **52**, **54**, according to an embodiment of the invention. The embodiment of FIG. **6** does not include the terminal box **14** (shown in FIGS. **1-5**) so that the orientation of the first and second angled studs **52**, **54** can be clearly seen. The first and second angled studs **52**, **54** are shown extending well outside the outer housing **16**. In alternate embodiments, the first and second angled studs **52**, **54** may extend more or less than shown in FIG. **16**.

First angled stud **52** has central axis **58**, which is shown extending through and outward from the center of the first angled stud **52**, and is also shown extending all of the way through the outer housing **16**. Similarly, second angled stud **54** has central axis **60**, which is shown extending through and outward from the center of second angled stud **54**, and is also shown extending all of the way through the outer housing **16**. Central axis **58** and central axis **60** extend substantially parallel to one another, and both axes **58**, **60** pass along the same side of the longitudinal central axis **62**. In other words, the outer housing could be divided in two equal halves, such that the central axes **58**, **60** pass through only one of the two equal halves.

Having such an orientation, in which the central axes **58**, **60** of first and second angled studs **52**, **54** pass to a single side of the compressor's longitudinal central axis **62**, allows for the offset nature of the terminal box attachment in which the terminal box **14** is a deeper on one side than the other. This stud orientation also allows for a terminal box **14** with a smaller impact on the overall compressor assembly footprint. Also, the angle, in which the first and second angled studs **52**, **54** are inserted, allows for more space inside the terminal box **14**. It can be sees from the top-down view of FIG. **6** that if the studs axes **58**, **60** were normal to the compressor longitudinal central axis **62**, the studs **52**, **54** would then interfere with the internal components of the terminal box **14**. Angling the studs **52**, **54**, as shown, allows for the inclusion of these internal components without significantly increasing the overall compressor footprint.

While a scroll compressor is described above, embodiments of principles of the present invention are envisioned to be used with various suitable types of compressors.

All references, including publications, patent applications, and patents cited herein are hereby incorporated by reference to the same extent as if each reference were individually and specifically indicated to be incorporated by reference and were set forth in its entirety herein.

The use of the terms "a" and "an" and "the" and similar referents in the context of describing the invention (especially in the context of the following claims) is to be construed to

cover both the singular and the plural, unless otherwise indicated herein or clearly contradicted by context. The terms "comprising," "having," "including," and "containing" are to be construed as open-ended terms (i.e., meaning "including, but not limited to,") unless otherwise noted. Recitation of ranges of values herein are merely intended to serve as a shorthand method of referring individually to each separate value falling within the range, unless otherwise indicated herein, and each separate value is incorporated into the specification as if it were individually recited herein. All methods described herein can be performed in any suitable order unless otherwise indicated herein or otherwise clearly contradicted by context. The use of any and all examples, or exemplary language (e.g., "such as") provided herein, is intended merely to better illuminate the invention and does not pose a limitation on the scope of the invention unless otherwise claimed. No language in the specification should be construed as indicating any non-claimed element as essential to the practice of the invention.

For purposes of this disclosure, the term "coupled" means the mechanical, electrical, or fluid joining of two components directly or indirectly to one another. Such joining may be stationary in nature or moveable in nature. Such joining may be achieved with the two components and any additional intermediate members being integrally formed as a single unitary body with one another or the two components and any additional member being attached to one another. Such joining may be permanent in nature or alternatively be removable or releasable in nature.

Preferred embodiments of this invention are described herein, including the best mode known to the inventors for carrying out the invention. Variations of those preferred embodiments may become apparent to those of ordinary skill in the art upon reading the foregoing description. The inventors expect skilled artisans to employ such variations as appropriate, and the inventors intend for the invention to be practiced otherwise than as specifically described herein. Accordingly, this invention includes all modifications and equivalents of the subject matter recited in the claims appended hereto as permitted by applicable law. Moreover, any combination of the above-described elements in all possible variations thereof is encompassed by the invention unless otherwise indicated herein or otherwise clearly contradicted by context.

What is claimed is:

1. A compressor assembly comprising:

a housing that is annular and surrounds a longitudinal central axis;

a compressor housed in the housing;

a terminal box; and

a first stud coupling the terminal box directly to the housing, the first stud defining a first central axis; and

a second stud coupling the terminal box directly to the housing, the second stud defining a second central axis;

wherein both the first and second central axes do not intersect with the longitudinal central axis of the housing and extend through the housing on the same side of the longitudinal central axis of the housing.

2. The compressor assembly of claim **1**, wherein the first central axis is substantially parallel to the second central axis.

3. The compressor assembly of claim **1**, wherein second central axis of the second stud does not intersect the longitudinal central axis of the housing.

4. The compressor assembly of claim **1**, wherein the first stud and the second stud are offset horizontally and vertically relative to one another.

5. The compressor assembly of claim **1**, further comprising an external block and a protection module positioned within the terminal box;

wherein the first stud is arranged in a first plane that extends between the external block and the protection module; and

wherein the second stud is located in a second plane parallel and non-coextensive with the first plane, the first and second planes being vertical and including the first central axis and the second central axis respectively.

6. The compressor assembly of claim **1**, wherein the terminal box includes first and second sidewalls;

wherein the first stud is a distance D from the second sidewall;

wherein the first stud is a distance D' from the first sidewall; and

wherein D' is greater than D.

7. The compressor assembly of claim **6**, wherein the second stud is the distance D from the first sidewall;

wherein the second stud is the distance D' from the second sidewall; and

wherein the first stud and the second stud are offset by the distance D'−D.

8. The compressor assembly of claim **1**, wherein the volume defined by the portion of the terminal box between a plane in which the first stud is positioned and the second sidewall is greater than the volume defined by the portion of the terminal box between the second stud and the first sidewall.

9. The compressor assembly of claim **1**, further comprising:

a block and a protection module disposed in the terminal box, wherein first and second sidewalls, a top wall, a bottom wall, and a back wall define the terminal box, and wherein the second stud is located closer to the first sidewall than the first stud.

10. The compressor assembly of claim **9**, wherein a radius from the longitudinal central axis of the housing and the first central axis of the first stud define a non-zero angle.

11. The compressor assembly of claim **10**, wherein a radius from the longitudinal central axis of the housing the second central axis of the second stud define a non-zero angle.

12. The compressor assembly of claim **11**, wherein the first and second central axes are generally parallel with the first and second sidewalls;

wherein the block is proximate the first sidewall and the top wall;

wherein the protection module is proximate the second sidewall and the top wall; and

wherein at least one of the first and second studs are located between the block and the protection module.

13. The compressor of claim **10**, wherein the second sidewall is longer in a direction generally parallel with the first central axis of the first stud than the first sidewall.

14. The compressor assembly of claim **9**, wherein the back wall extends between the first and second sidewalls and includes a first portion coupled with and generally orthogonal to the first sidewall and a second portion coupled with and generally orthogonal to the second side wall; and

wherein the second portion is longer than the first portion.

15. The compressor assembly of claim **14**, wherein the housing includes a generally cylindrical portion;

wherein the back wall also includes a third portion coupling the first and second portions and

wherein the third portion of the back wall generally abuts and has a radius of curvature generally matched to the portion of the generally cylindrical portion of the housing with which it abuts.

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